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IS : 9741 (Part I) - 1981

(Reaffirmed 2006)

Indian Standard

SPECIFICATION FOR VIDEO TEST SIGNAL GENERATOR

PART I METHODS OF MEASUREMENTS

UDC 621·397·3 : 621·317·799 : 621·317·3

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SPECIFICATION FOR VIDEO TEST SIGNAL GENERATOR

PART I METHODS OF MEASUREMENTS

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Indian Standard

SPECIFICATION FOR VIDEO TEST SIGNAL GENERATOR

PART I METHODS OF MEASUREMENTS

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 12 February 1981, after the draft finalized by the Electronic Measuring Equipment Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 This standard (Part I) specifies the methods of measurement for video test signal generator. The requirements of the video test signal generator are covered by IS : 9741 (Part II)-1981*.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part I) covers test methods for video test signal generator.

2. METHODS OF MEASUREMENT

2.1 The output of the signal generator is connected to a 25 MHz cathode-ray-oscilloscope with a delayed sweep and terminated with 75 ohms. The synchronizing signal is derived from the internal pulse generator.

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*Specification for video test signal generator: Part II Requirements.

†Rules for rounding off numerical values (*revised*).

2.1.1 *Measurement of Output Wave Forms*

2.1.1.1 *2T/20T pulse*

a) The pulse is displayed on the cathode-ray-oscilloscope with a graticule calibrated in percent of *K* factor. The *K* factor is read off the graticule directly by noting the percent of the *K* factor curve which just encloses the displayed image, whose vertical gain has been adjusted to make the image to just touch the 0 and 100 markings on the graticule (*see* Fig. 1).

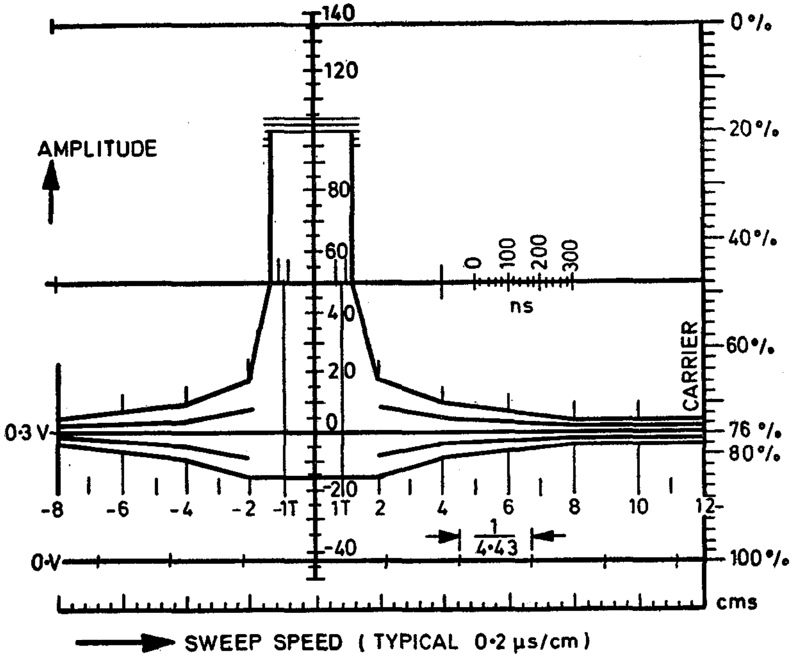


Fig. 1 Graticule in Percent of *K* Factor

b) The half amplitude duration is measured by displaying the pulse on a graticule, the sweep rate being in 'calibrated' position, triggered at *H* rate (*see* Fig. 2).

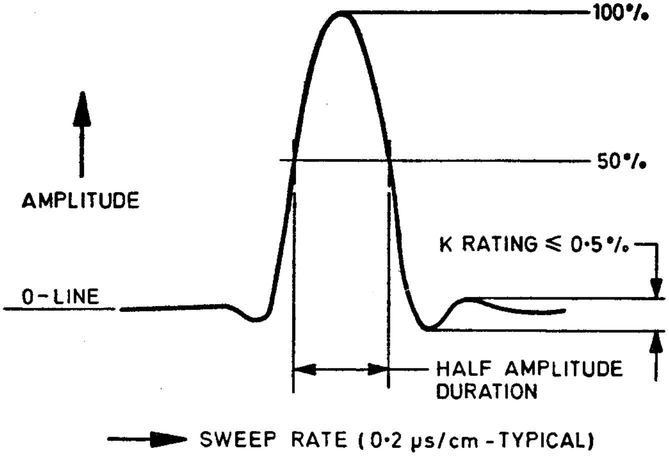


Fig. 2 Graticule in Terms of Sweep Rate

2.1.1.2 *Bar*

a) *Rise time and fall time* — The signal is displayed on the oscilloscope with the time base in delayed mode. The rise and fall time *B* is measured off the graticule (10 percent to 90 percent of the pulse height) as shown in Fig. 3.

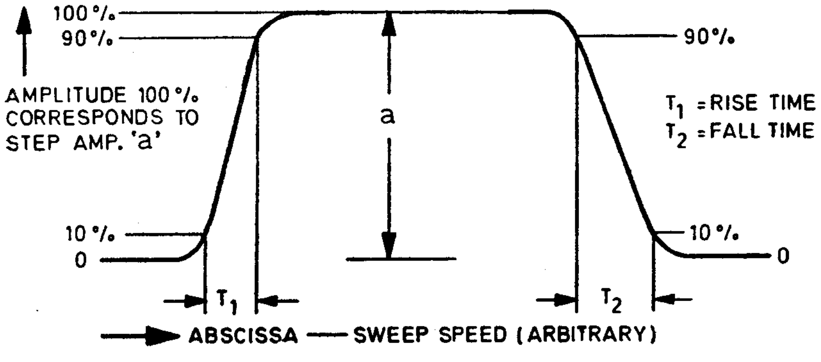
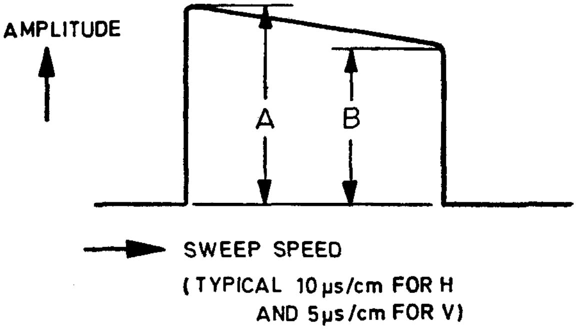

100%
90%
AMPLITUDE 100% CORRESPONDS TO STEP AMP. 'a'
10%
0
a
90%
T_1 = RISE TIME
T_2 = FALL TIME
10%
0
T_1
T_2
ABSCISSA — SWEEP SPEED (ARBITRARY)

Fig. 3 Rise Time and Fall Time

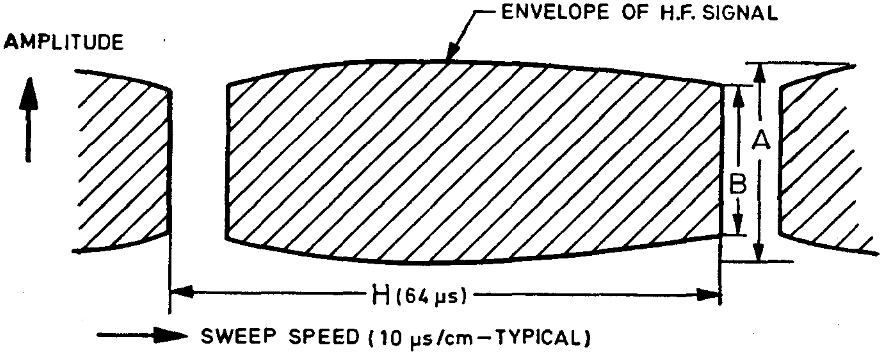
b) *Tilt* — The display is vertically amplified to measure the tilt in the horizontal portion of the square wave and is read as percent of the total height as shown in Fig. 4.



$$\text{TILT} = \frac{A-B}{(A+B)/2} \times 100\,\%$$

FIG. 4 TILT

2.1.1.3 *Saw tooth signal* — The saw tooth with the HF signal on it is passed through a filter of narrow pass band, which passes the HF. The output displayed at *H* rate, should show a constant level of HF signal (*see* Fig. 5).



$$\text{NON LINEARITY} = \frac{A-B}{A+B} \times 100\,\%$$

FIG. 5 NON LINEARITY

2.1.1.4 *Stair step* — The rise time is measured as at **2.1.1.1**(a). The vertical gain is increased and the height of each step is measured separately. For this measurement the oscilloscope should have a minimum vertical sensitivity of the order of 1 mV/cm or better (*see* Fig. 6).

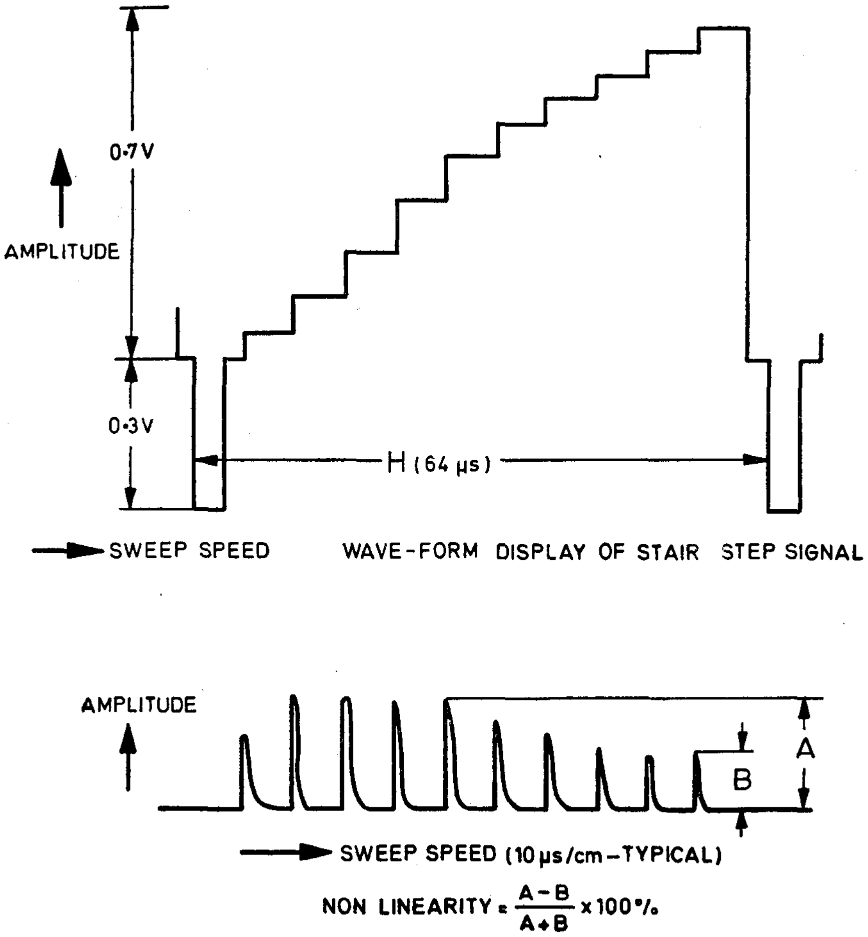
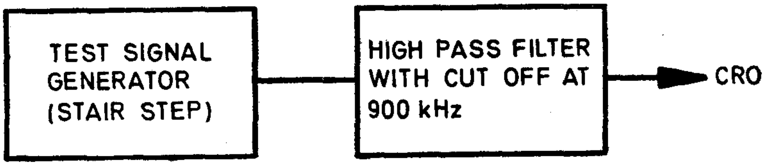

0·7 V
AMPLITUDE
0·3 V
H (64 µs)
SWEEP SPEED
WAVE-FORM DISPLAY OF STAIR STEP SIGNAL
AMPLITUDE
A
B
SWEEP SPEED (10 µs/cm – TYPICAL)
NON LINEARITY = $\frac{A-B}{A+B}$ x 100 %

FIG. 6 STAIR STEP

Alternatively the following circuit may be used.


TEST SIGNAL GENERATOR (STAIR STEP)
HIGH PASS FILTER WITH CUT OFF AT 900 kHz
CRO

The display in this case is 10 spikes corresponding to the 10 steps and these heights may be compared.

2.1.1.5 *50/15 k/250 kHz square wave*

a) *Rise time* — This is measured as at **2.1.1.2**(a).

b) *Overshoot* — The display on oscilloscope is magnified (vertically) and the height of the overshoot of the square wave is compared to the total height of the square wave (*see* Fig. 7).

c) *Pulse tilt* — This is measured as at **2.1.1.2**(b).

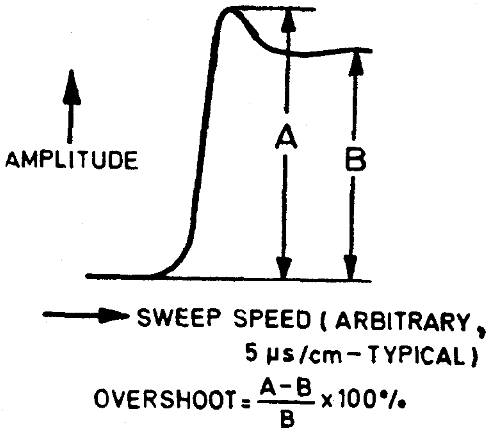

AMPLITUDE
A
B
SWEEP SPEED (ARBITRARY, 5 μs/cm – TYPICAL)
OVERSHOOT = (A−B)/B × 100%

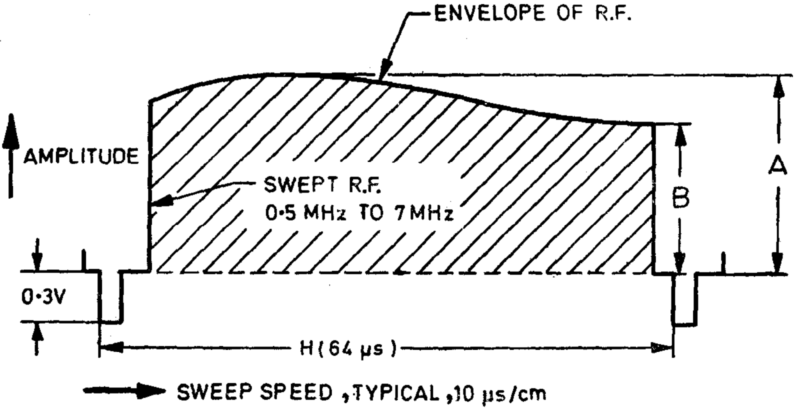
Fig. 7 Overshoot

2.1.1.6 *Multi burst signal* — The signal is displayed on the oscilloscope. The time occupied by each of the burst frequencies is measured by choosing the suitable horizontal sweep rate. The display is further enlarged and displayed using delayed mode. The period T of the sine waves in each of the burst is found out by noting the time 't' for number of waves 'n' and then calculating 'T' from $T = t/n$. They are to be one microsecond; 0·5 microsecond; 0·33 microsecond; and 0·25 microsecond for the five burst frequencies.

2.1.1.7 *Video-wobbulator*

a) *Level* — The display on the oscilloscope shall indicate the frequency response. The display is horizontally locked to the wobbulator rate and the amplitude variation (the difference in level between maximum A and minimum B) in the range 0·5 to 7 MHz is noted (*see* Fig. 8). This is expressed in dBs with reference to the average level $\frac{(A+B)}{2}$ as below:

$$\text{Frequency response in dBs} = 20 \log (A - B) - \frac{(A+B)}{2}$$



$$\text{RESPONSE IN dBs} = 20 \text{ LOG } \frac{\text{AVERAGE} - \text{DIFFERENCE}}{\text{AVERAGE}}$$

$$= 20 \text{ LOG } \frac{(A+B)/2 - (A-B)}{(A+B)/2}$$

FIG. 8 LEVEL

b) *Frequency* — With the markers on, the frequency of the sinusoidal signal at marker positions can be checked as in **2.1.1.6**.

Alternatively, the output wave form without markers can be mixed with a one MHz crystal output in a ringing circuit and the output displayed on the oscilloscope. The marker thus created can be checked (position compared) with the markers generated from the signal generator.

3. INPUT SIGNALS

3.1 The blanking synchronizing and video signals are varied within the stipulated limits one at a time and the variation in the output is monitored for its level variations on the oscilloscope. There should be no change in output levels when the inputs are changed within the specified limits.